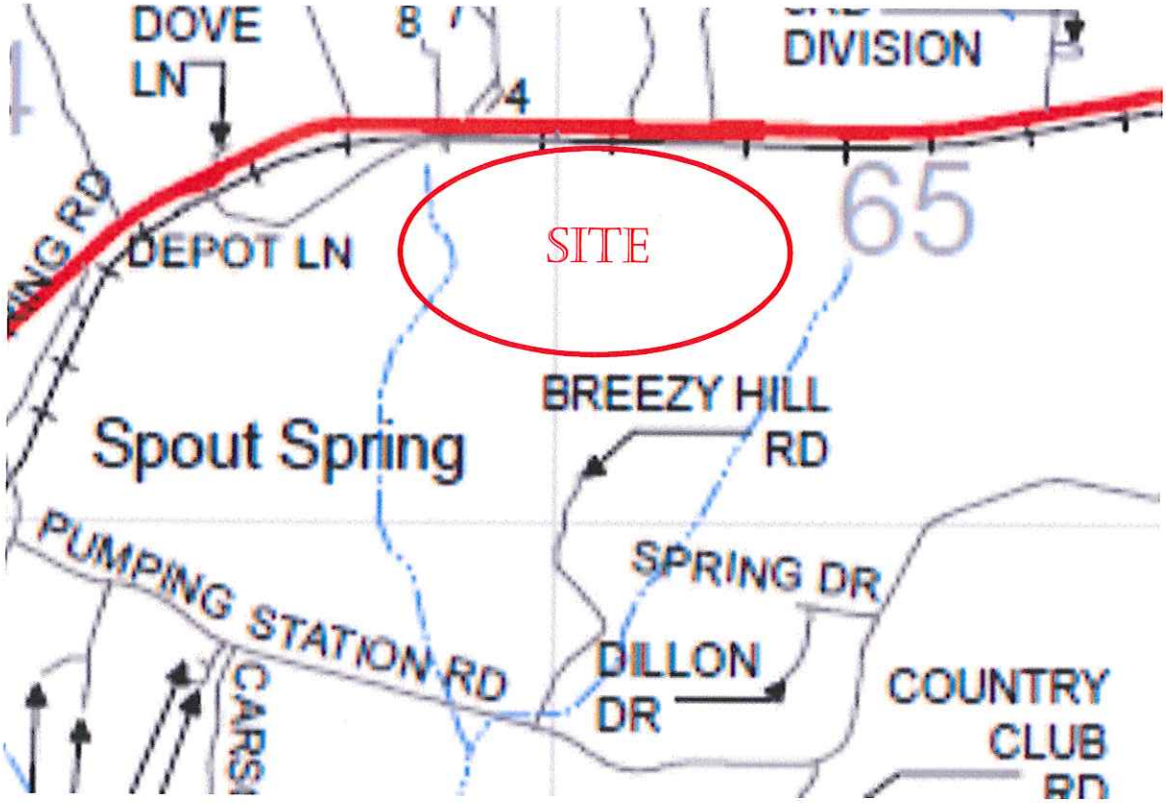
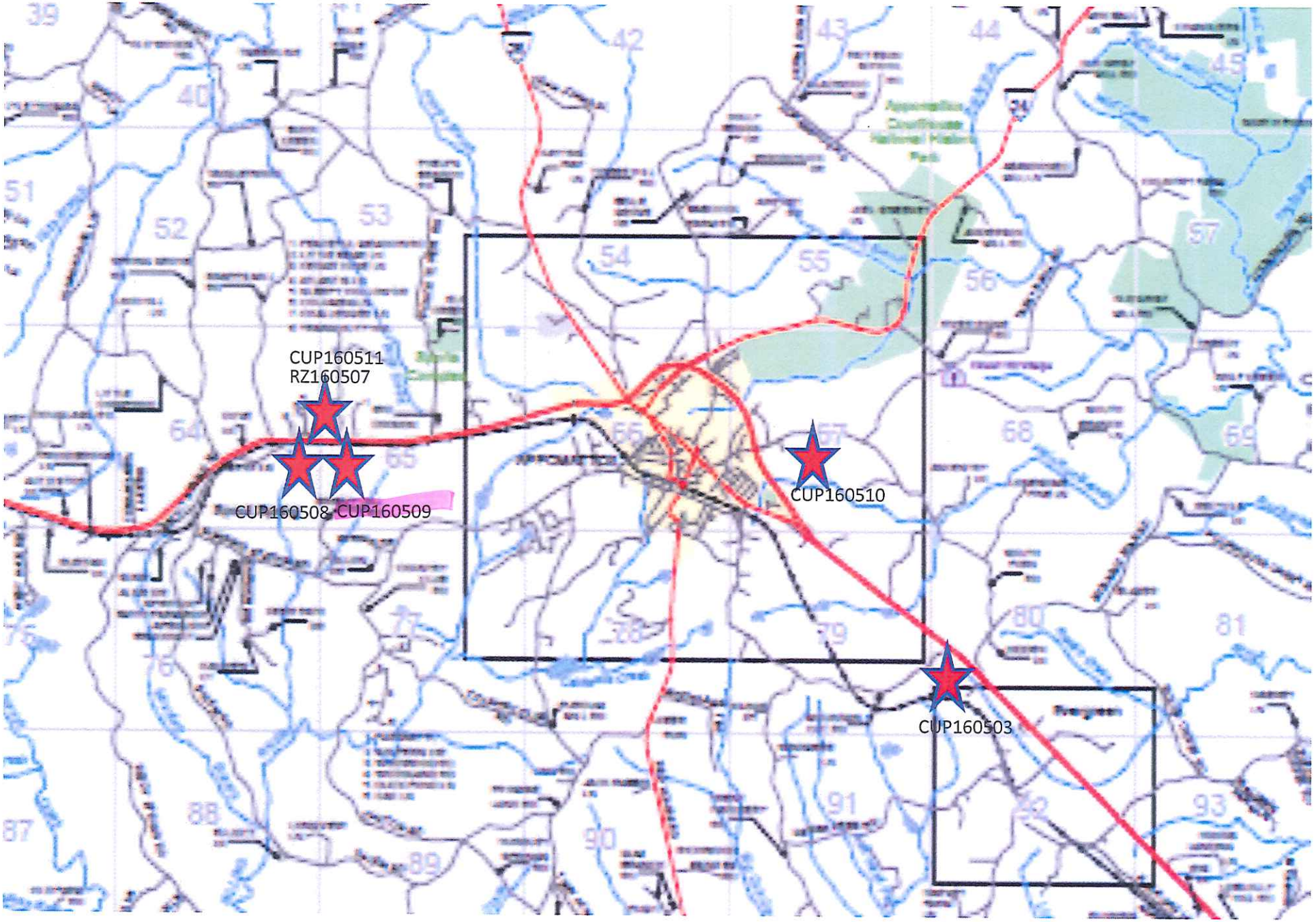
Appomattox County
VIRGINIA

JOINT PLANNING COMMISSION MEETING FOR SEPTEMBER 14, 2016



CUP 16-0509
NEW ENERGY VENTURES LLC
MOON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County of Appomattox
Department of Community Development
Staff Report

To: Planning Commission

From: Johnnie Roark
Director of Community Development

Date: September 14, 2016

RE: Conditional Use Permit Application CUP16-0509-Moon/New Energy Ventures LLC

SYNOPSIS

New Energy Ventures LLC (applicant)/Danny Moon (property owner) is requesting a conditional use permit to locate a solar farm (Resource Extraction) at property located off of Richmond Highway in the Spout Spring community.

Specifics

Applicant:	New Energy Ventures LLC (Jack Sterne, agent)
Property Owner:	Danny Moon
Current Use:	Agricultural
Proposed Use:	add Solar Farm (Resource Extraction)
Surrounding Uses:	Sporadic Residential, Agricultural
Parcel Size:	Approximately 108 acres, approx.. 28 acres for this use
Zoning:	A-1, Agricultural
Surrounding Zoning:	A-1, Agricultural
Tax Map Number(s):	63 (A) 17

ANALYSIS

New Energy Ventures is proposing to build a 15 MW solar electric farm to be located on two properties adjacent to one another (Moon and Carson) and adjacent to Richmond Highway (Route 460) in the Spout Spring Area. This property (Moon) is the smaller of the two properties at 108 acres, with approximately 28 acres being used for this project. The other property (Carson) is 190 acres with approximately 50 acres being used for this project. Both properties are currently being used for cattle grazing with the remainder of the property mainly in timber. Both properties will be used to develop a single project, which will be interconnected at Dominion Power's South Creek Substation, approximately 1.5 miles to the east. The solar farm will deploy approximately 57,000 solar PV panels using a fixed-tilt ground-mounted configuration. The panels will be mounted on galvanized steel frames approximately 4 to 6 feet above ground. A small maintenance shed may be constructed on-site. Construction is expected to take 6-9 months with a completion timeframe of the fourth quarter of 2017.

PROJECT IMPACTS

Project impacts will be minimal once construction is complete. Construction will provide approximately 180 jobs during the construction phase. There will be some visual impact from

Richmond Highway (Route 460) and from Depot Lane (Route 674). However, the existing railroad berm will provide some visual buffer. The property is not visible from the south (Pumping Station Road). Access to the property would be via two existing entrances on Richmond Highway. The project will use no water or create no air emissions or noise. The loudest equipment, the electric inverters, will produce approximately 60 db at a distance of 30 feet. For example, an air conditioning unit at 100 feet is approximately the same decibel level. For contrast, ambient highway noise along Route 460 is estimated to be 70 db. The project will run downhill thus increasing the limited visibility from Richmond Highway.

After construction, the site will be visited 5 or 6 times annually and as maintenance is needed.

The project has been designed to avoid several small streams on the properties and tree cutting will be kept to a minimum. The applicant will require a variance from the side setback along the mutual property line. The variance will be processed upon completion of the CUP.

The applicant states that the lease agreement includes a bond that will be held in place pending the complete removal of the facility at the end of its useful life (20 to 30 years).

Planning Considerations

The Appomattox County Zoning Ordinance lists the following standards by which a conditional use should be evaluated.

1. Will be harmonious with and in accordance with the general objectives or with any specific objective of Appomattox Comprehensive Plan and/or this chapter.
   This use appears to be in line with the general objectives of the Comp Plan.

2. Will be designed, operated and maintained so as to be harmonious and appropriate with the existing or intended character of the general vicinity; and that such use will not change the essential character of the same area.
   The proposed use is being designed to mitigate any impact to the greatest extent.

3. Will not be hazardous or disturbing to existing or future neighborhood uses.
   The proposed use will not be hazardous to the neighborhood.

4. Will be served adequately by essential public facilities and services such as highways, streets, police and fire protection, drainage structures, refuse disposal, water and sewer and schools; or that the persons or agencies responsible for the establishment of the proposed use shall be able to provide adequately any such services.
   The impact on public facilities is negligible.

5. Will not create excessive additional requirements at public costs for public facilities and services; and will not be detrimental to the economic welfare of the community.
   Use will not negatively impact public facilities or services. Use provides added benefit by enhancing the nation's green infrastructure.

6. Will have vehicular approaches to the property which shall be so designed so as not to create any interference with traffic on surrounding public streets or roads.
   Minimal traffic will be associated with this use.

7. Will not result in the destruction, loss or damage of a natural, scenic, or historic feature of major importance.
   The proposed use will not negatively impact natural, scenic or historic features based on sketch plan.

Recommended Conditions

1. The project will generally conform to the sketch drawing marked as "Exhibit A" and submitted with the petition August 26, 2016.
2. All applicable local, state, and federal laws will be followed as necessary.
3. At the end of the project "life cycle", all equipment, including panels, mounts, etc. will be removed and the property returned to its previous state as productive farmland.

Planning Commission Action:

The following motions are available for the Planning Commission:

To approve as submitted:

For reason of public necessity, convenience, general welfare, and good zoning practice, the Appomattox County Planning Commission moves to recommend approval of the Conditional Use Permit petition of New Energy Ventures LLC (applicant), Danny Moon (owner) to operate a solar farm (Resource Extraction), as submitted.

To approve with conditions:

For reason of public necessity, convenience, general welfare, and good zoning practice, the Appomattox County Planning Commission moves to recommend approval of the Conditional Use Permit petition of New Energy Ventures LLC (applicant), Danny Moon (owner) to operate a solar farm (Resource Extraction), with the following conditions:

_____

_____

To deny:

For reason of public necessity, convenience, general welfare, and good zoning practice, the Appomattox County Planning Commission moves to deny the Conditional Use Permit petition of, New Energy Ventures LLC (applicant), Danny Moon (owner) to operate a solar farm (Resource Extraction), as the petitioner has failed to show the following:

_____

_____

Appomattox County

Please print in blue or black ink or typewrite. If not applicable, write N/A.

APPLICATION INFORMATION

Note: If the applicant is not the property owner, then an owner's authority letter must be submitted with the application.

Applicant Name: New Energy Ventures, Inc.

Address: _____

Phone: (760) 212-8120 email: john@kampfcapital.com

Property Owner Name: Danny R. Moon

Address: 619 Breezy Hill Rd. Spout Spring, VA 24593

Phone: (434) 660-7084 email: danny@cseonline.net

Authorized Agent/Contact Person: Jack Sterne

Address: 1405 Monroe St. NE Washington, DC 20017

Phone: (202) 844-6464 email: jack@risingtidestrategies.com

Project Information

Location/Address of Property (from County Administration office): N/A

Tax Map Number(s): 63 A 17

Election District: Spout Spring

Size of Parcel(s):. 108.13

Amount of area to be utilized by proposed use: 27.7 acres

Current Zoning: A-1

Current Land Use: Agricultural

Proposed Zoning: N/A

Proposed Land Use: Solar Farm

Please describe the proposed project or purpose of the request: See attached.

Proffers: The applicant may proffer inwriting reasonable conditions inaddition to the requested zoning district regulations. All proffered conditions must be in writing, signed and presented prior to the start of the Board of Supervisor's public hearing. **Are proffers proposed? o YES X NO (If yes, please submit proffer statement to staff.)**

Traffic Impact Analysis: If the proposed use meets VDOT's requirements for a traffic impact analysis, then the applicant must meet with VDOT and submit a TIA along with the Development Application.

Justification

The Planning Commission will study the request to determine the need and justification for the change in terms of public health, safety, and general welfare. Please answer the following questions as thoroughly as possible. Attach additional information if necessary.

Please explain how the request furthers the purpose of the Zoning Ordinance and the zoning district classification for which the project is proposed.

Please see attached supplemental information for these three questions.

Please explain how the project conforms to the general guidelines and policies contained in the Appomattox County Comprehensive Plan.

Please describe the impact(s) of the request on the property itself, the adjoining properties, and the surrounding area as well as impact(s) on the public services and facilities, including water, sewer, roads, schools, parks/recreation, and fire/rescue.

Certification

I hereby certify that this application is complete and accurate to the best of my knowledge, and I authorize County representative(s) entry onto the property for purposes of reviewing this request.

Owner/Agent Signature: _____ Date: 8/24/16

Print Name: Jack K Stone

NEW ENERGY VENTURES, INC.

Subject: Supporting Information for Conditional Use Permit for Solar Farm
Reference: 531 Depot Lane, Parcel 62 A 170A
Date: August 25, 2016

Project Description

New Energy Ventures is proposing to build a 15 MW solar electric farm to be located on two properties adjacent to Highway 460, just west of Appomattox. The first property (the subject property) is approximately 190 acres, Parcel 62 A 170 A, zoned Agricultural (A-1). The property has a residence on the west end and a substantial cleared area, which is currently used for cattle grazing. The remainder of the property is timbered. New Energy Ventures has entered into a Lease-Option Agreement with the property owners, Cliff W. Carson and Henriette C. Beasley, which allows New Energy Ventures the right to proceed with development of a solar electric farm. We have also executed a similar agreement with Danny R. Moon, the owner of the property to the east, Parcel 63 A 17.

We will use both properties to develop a single project, which will be interconnected at Dominion Virginia Power's South Creek Substation, approximately 1.5 miles to the east. The solar farm will deploy approximately 57,000 solar PV panels using a fixed-tilt ground-mounted configuration. The panels will be mounted on galvanized steel frames approximately 4-6 feet above ground (please see Ex. B). In addition, one small maintenance shed may be constructed on the site. Total project capital cost is estimated at between $17 million and $20 million.

Compliance with Zoning Ordinance

This project complies with the purpose of the zoning ordinance by allowing the owners of land zoned A-1 to derive additional income from their land in a manner consistent with surrounding agricultural uses. Because we are spreading the project over two adjacent properties, both owners will still be able to use a substantial portion of their property for grazing, timbering, or both. As a result, both parcels will retain their essential agricultural characteristics, "protecting existing and future farming operations," which is the purpose of the A-1 zone.

Section 19.6-67(A) of the county code also states that the A-1 district "is intended to minimize the demand for unanticipated public sewer, public water, and new roadways, by reducing development densities and discouraging large-scale development." The proposed project will not require any public sewer, water or roadway development, and will allow some development by the property owners without increasing residential densities.

The proposed solar farm is similar in character and visual impact to a number of uses allowed as of right in the A-1 zone, such as a commercial kennel, an intensive farming facility, a residential human care facility, a commercial stable, or a winery. It is substantially less intrusive, from both a visual and audio perspective, than some conditional uses that are named in the zoning ordinance, such as an automobile graveyard, a transfer station, or a wind energy system.

Compliance with Comprehensive Plan

The project will provide approximately 180 jobs during the construction phase, and then ongoing income during the life of the project that will inure to the benefit of Appomattox County. The project also provides the highest and best economic use of the property. Because of the location of the property next to the railroad tracks, it would be extremely challenging to develop it for any other future use (such as retail), and the income to be derived from the project is substantially more than the owners can realize through grazing or timbering their land.

As described below, the project will result in no environmental impacts and actually provides environmental benefits by creating clean, non-polluting electricity. In addition, the project may even provide a draw for the types of industries that have corporate commitments to procure power from clean energy sources. Dominion has a program by which it can sell power from this project directly to such customers, and the Economic Development Authority of Appomattox County could use the existence of the project as a potential lure for such companies.

Project Impacts

The impacts of the project will be minimal, and it will be barely visible from Hwy 460. The project will use no water in the solar electric generation process, and will generate no air emissions and no noise. There will be no additional burden to the County's infrastructure including roads, water and sewer service, schools, or fire/police.

The system generates electricity during the day-time only, and will not produce noise at night. The electric inverters, the loudest equipment, will produce approximately 60db at a distance of approximately 30 feet. There will be no permanent light fixtures. By their very nature, solar panels absorb sunlight and produce no glare or glint. Moreover, because there is a berm for the railroad between Hwy 460 and the project site, and the project will run downhill from that high point on the property, it will be virtually invisible to passing motorists.

The proposed impervious area is expected to be 2-3%. The storm-water management system will comply with applicable State and County requirements. The existing site land is a combination of grazing and woodlands. While there are some spring-fed streams on both the Carson and Moon properties, the project has been designed to avoid any potential impact on those streams. Tree-clearing will be kept to a minimum.

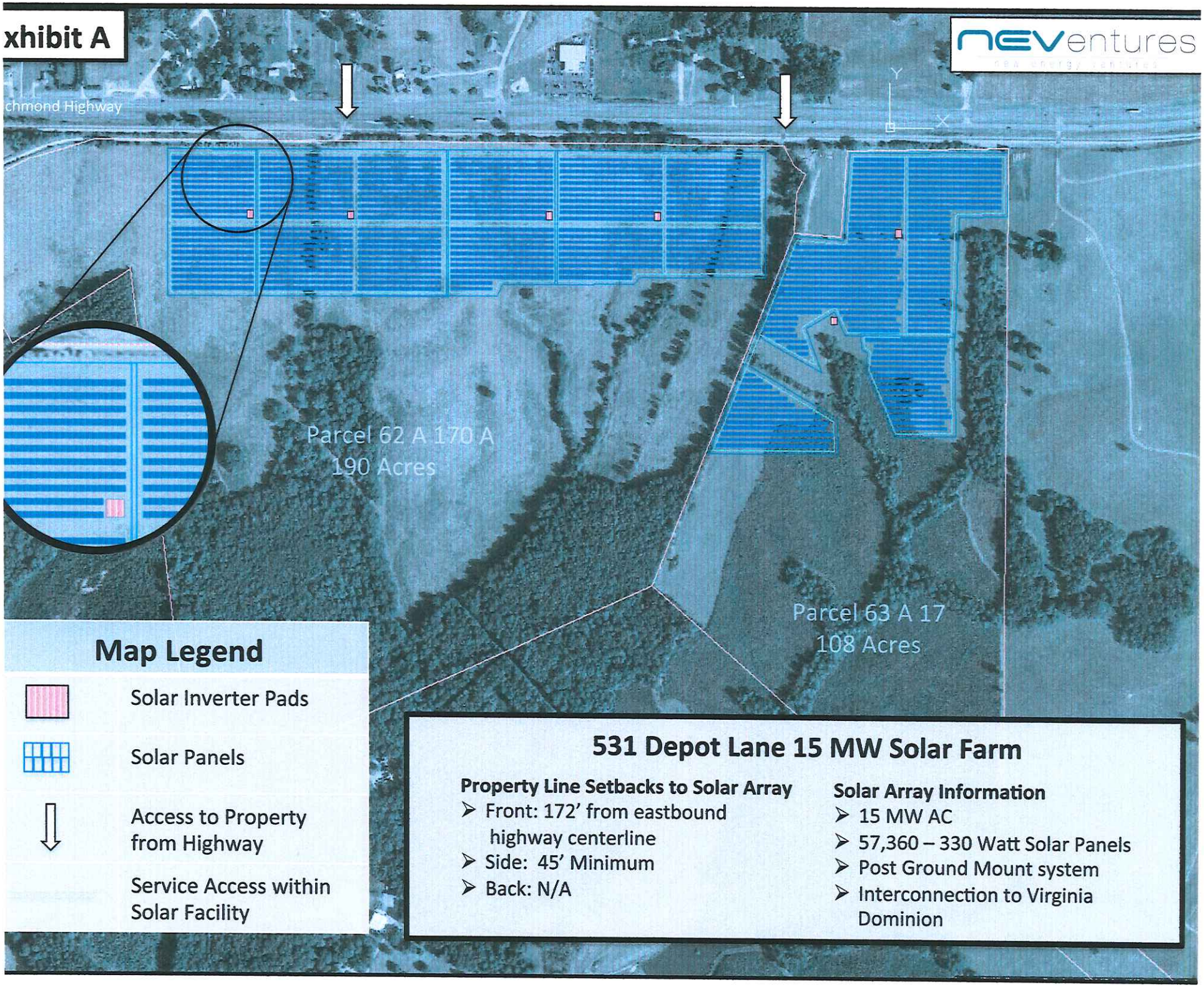
The project will comply with all applicable building, electrical, fire-protection and safety codes. Set-backs, buffering and landscaping will meet County ordinances and will adequately screen the site from neighboring properties, although we do request a mutual waiver of setback requirements where the project shares a property line with the adjacent Carson property.

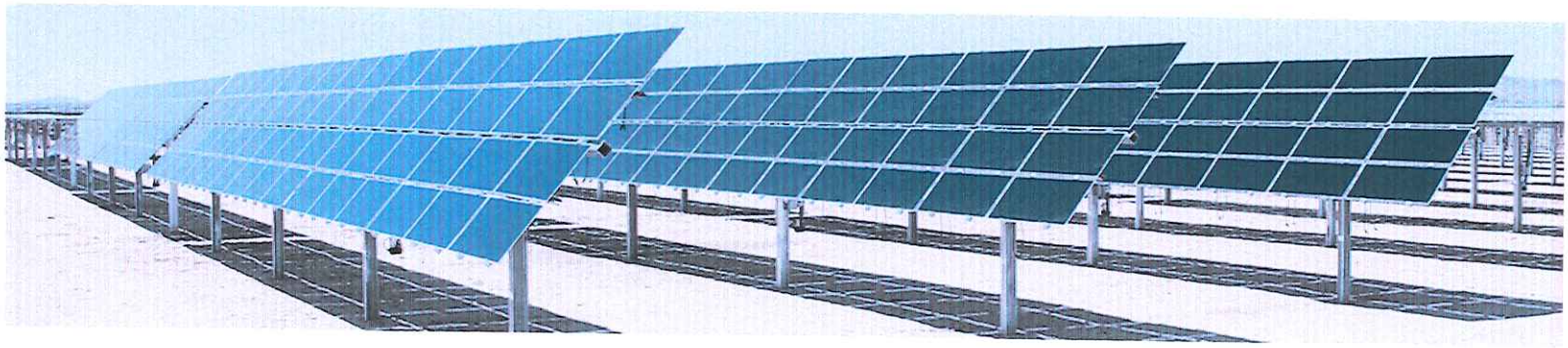
Subject to receiving all required local, State and Federal permits, construction is expected to take 6 to 9 months, with completion in the 4th quarter of 2017. The anticipated service life of the solar farm is 20-30 years. At the end of the service life of the project, the project will be completely removed, with the landscape returned to its former state, and the lease will provide for a bond to ensure such removal.

Adjoining Property Owners

Please provide the tax map identification number, name, and address of all parcels that adjoin your proposed development and directly across the street.

Tax Map ID#	Name	Address
62 A 170A	George P. Carson Estate	Rt. 3 Box 8090 Dilwyn VA 23936
74 A 77B	Danny R. Moon	619 Breezy Hill Rd. Spout Spring, VA 24593
74 A 77B	Danny R. Moon	619 Breezy Hill Rd. Spout Spring, VA 24593
74 A 77A	Lisa Moon Stinette	736 Breezy Hill Rd. Spout Spring, VA 24593
63 A 16	Spring Grove Properties, LLC	P.O. Box 610 Forest, VA 24551
63 A 18	Spring Grove Properties, LLC	P.O. Box 610 Forest, VA 24551
74 A 77	Danny R. Moon	619 Breezy Hill Rd. Spout Spring, VA 24593
62 A 169	Sharon B. Shrock	P.O. Box 702 Appomattox, VA 24522
75 A 4A	Danny R. Moon	619 Breezy Hill Rd. Spout Spring, VA 24593
N/A	Norfolk Southern Railroad (landowner across the street)	

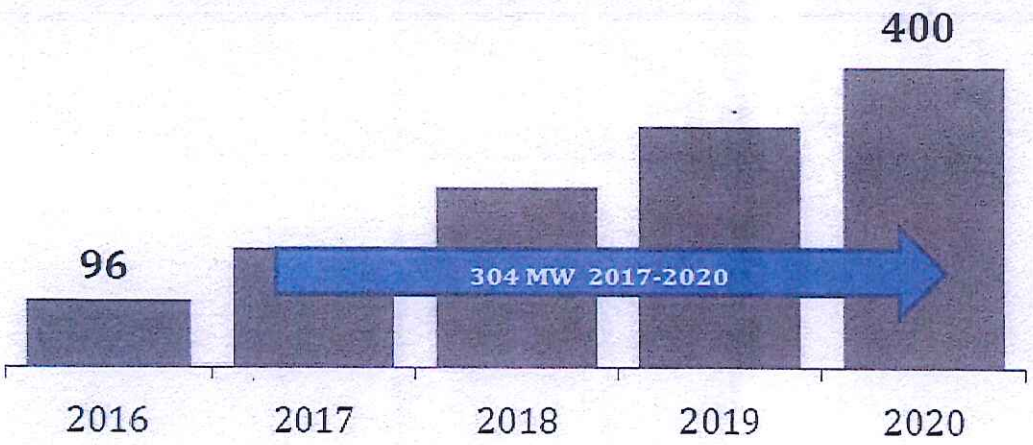

xhibit A
NEVentures
chmond Highway
Parcel 62 A 170 A
190 Acres
Parcel 63 A 17
108 Acres
Map Legend
Solar Inverter Pads
Solar Panels
Access to Property from Highway
Service Access within Solar Facility
531 Depot Lane 15 MW Solar Farm
Property Line Setbacks to Solar Array
Front: 172' from eastbound highway centerline
Side: 45' Minimum
Back: N/A
Solar Array Information
15 MW AC
57,360 – 330 Watt Solar Panels
Post Ground Mount system
Interconnection to Virginia Dominion



Ex. B – Fixed-tilt ground-mounted solar array

Solar Growth in Virginia

Renewable Utility Generation Growth → Up to 400 MW of Solar in VA

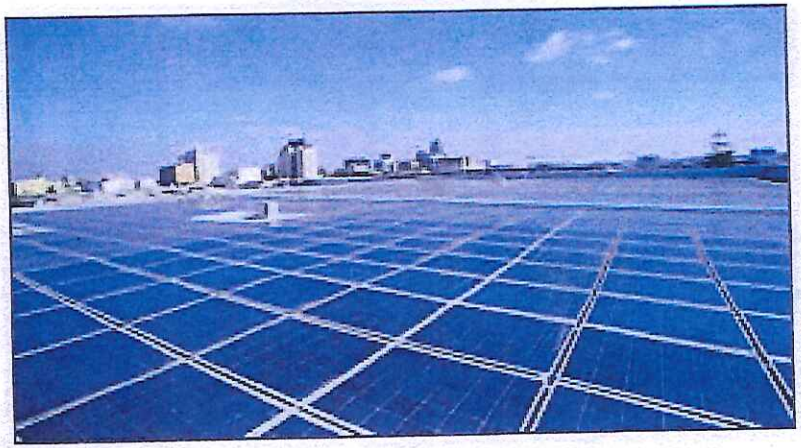


*Subject to regulatory approval

Solar – PV Markets Evolving Rapidly

Residential

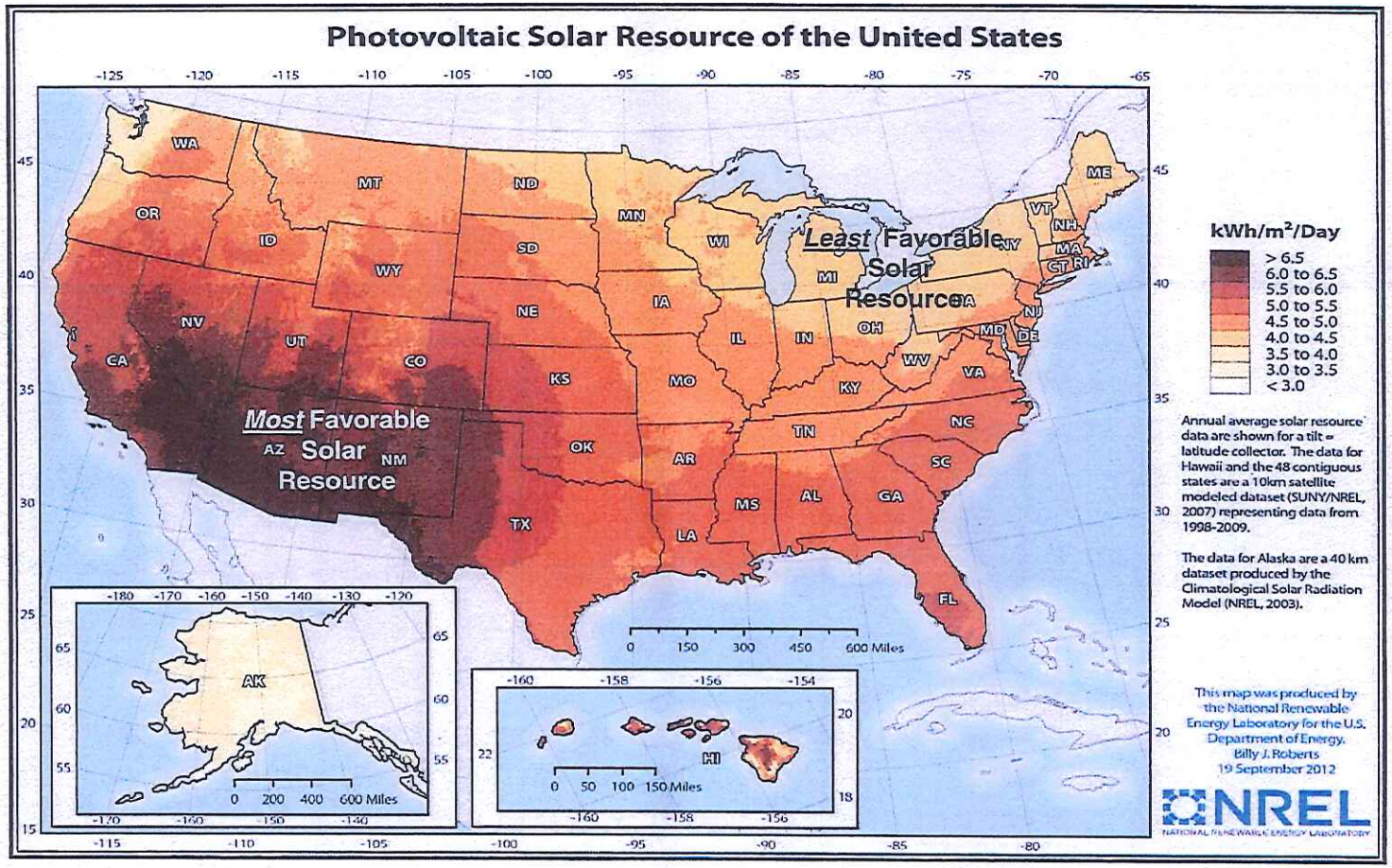
Commercial



Solar is a growing source for distributed & centralized electricity generation

Source: NREL

Solar Resources in the United States



Source: NREL

Types of Solar Energy

- ***Thermal***
  - Converts solar energy into heat
  - Examples: Space heating, pool heating & water heating

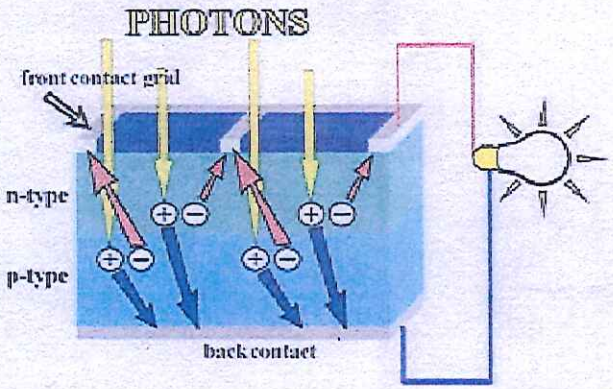
- ***Photovoltaic***
  - Converts solar energy into direct current (DC) electricity using photovoltaic solar cells
  - Examples: Electricity, cooling & lighting

- ***Concentrating***
  - Uses mirrors or lenses and tracking systems to focus a large area of sunlight into a small beam
  - Example: Concentrated heat used to active a steam turbine which in turn powers an electrical generator

Solar - Converting the Sun's Radiation into electricity

Photovoltaic (PV)

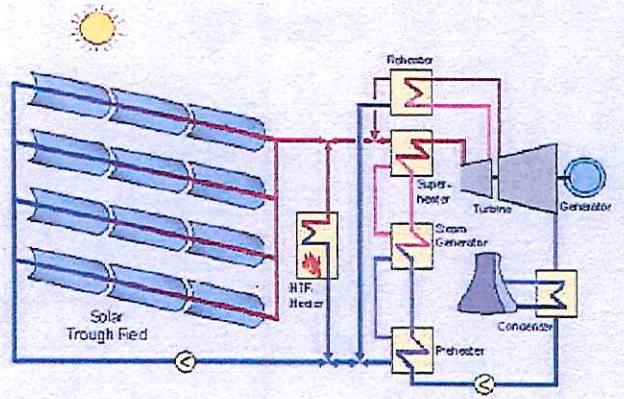
Cells of semi-conductors absorb photons and directly convert them into electrical current.



Can be used anywhere in the U.S

Concentrating Solar Power (CSP)

Mirrors focus solar radiation to heat fluids that are used to drive electric generators.

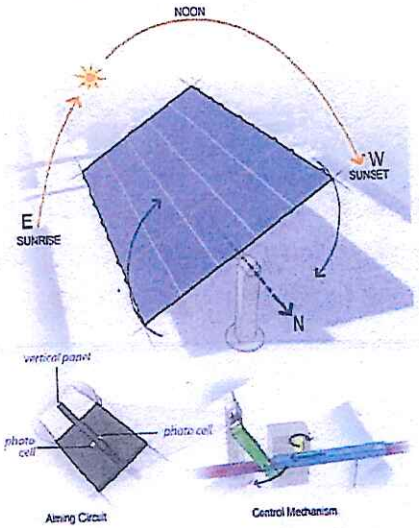


Predominantly in the Southwest U.S. (requires direct sunlight)

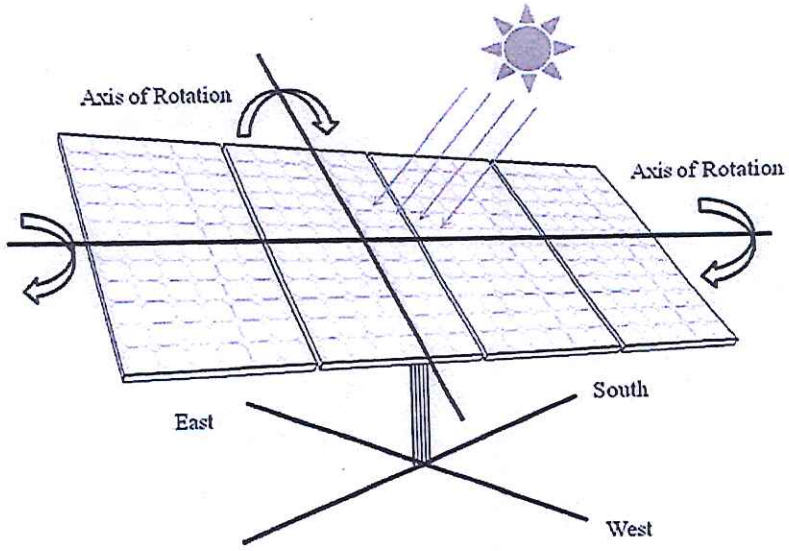
Source: NREL

Comparison of PV Technology

Fixed Tilt

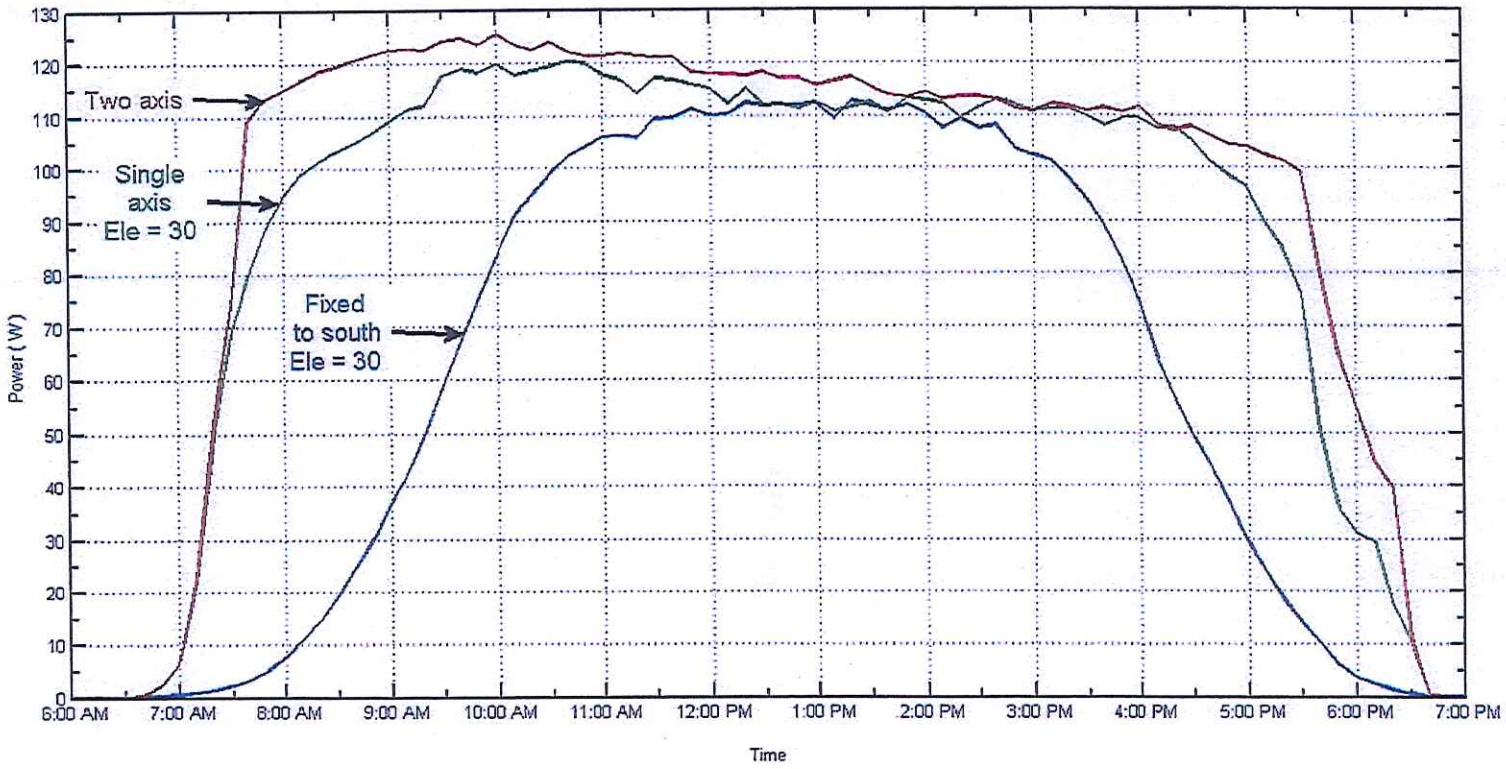


Single Axis Tracking



Dual Axis Tracking

Comparison of PV Technology Output



Single Axis = 20-25% increase

Dual Axis = 30-35% increase

Considerations for Solar Development

- Capacity Factor – ratio of actual output to potential output
- Coal, Natural Gas, Nuclear Power Generation – Base Load
  - Capacity Factor – 75 to 95%
- Solar, Wind – Intermittent Load
  - Capacity Factor – Solar 20 to 25%, Wind – 25 to 30%
  - Solar operates when the sun is shining
  - Wind produces more energy at night
  - Economical storage solutions needed

Types of Solar PV Mounting Systems

- ***Ground Mounted***
  - Pole mount- driven directly into ground or embedded in concrete
  - Foundation mount- concrete slabs or poured footings
  - Ballasted footing mount- no ground penetration rather concrete or steel bases; typical in capped landfills

- ***Trackers -increase the amount of energy produced per panel***
  - Sense the direction of the Sun and tilt the panels as needed for maximum exposure to the light
  - One Axis Tracking –increased performance 20-25%
  - Dual Axis Tracking- increases performance 30%

- ***Fixed Racks- hold panels stationary; set on poles above ground***

Connecting Solar to the Grid

- ***Electric Service Territory in Virginia***
  - Local Electric Cooperative
  - Municipal
  - Dominion Virginia Power

- ***Distribution Circuits***
  - Serves homes and businesses
  - Typically limited to up to 20 MW size projects (34.5 kV – 3 Phase)
  - May require re-conductoring or new circuits

- ***Transmission Circuits***
  - *115 kV – 230 kV – 500 kV*
  - *60 MW to 100 MW size projects*

Solar Panel Degradation Rates

Gradual Reduction in PV Module Output Over Time

Panel Degradation

- Water ingress and temperature stress are main cause of panel degradation
  - Soiling of panel glass from dirt and dust
  - Scratching of panel glass from wind, rain or hail
  - Antireflective glass deterioration
  - Corrosion of contacts due to exposure to water vapor
- Degradation Rates: Rule of thumb 3% year 1, less than 1%/year thereafter
  - Varies by panel design
    - Silicon only: Median - 0.5% per year, (0.7% average)*
    - Thin Film: Median - 1% per year, (1.5% average)*
  - Varies by technology
    - Amorphous Silicon (a-Si) - 0.95% per year*
    - Cadmium Telluride (CdTe) - 0.3% per year*
    - Copper Indium Gallium Sellenide (CIGS) – 0.02% per year*
    - Crystalline Silicon (mono-Si) – 0.23% per year*
    - Multicrystalline Silicon (multi-Si) – 0.59% per year*

Manufacture Guarantee

- Guarantee of efficiency rate varies by panel type and manufacturer
  - Sunpower: 90% of peak power for first 12 years, 80% through 25 years
  - First Solar: 90% of nominal power rating for 10 years, 80% for 25 years
  - Suntech: 90% of nominal power first 12 years, 85% 18 years, 80% 25 years

Solar Operating Life

- 30 – 35 years

*Source: NREL "Photovoltaic Degradation Rates – An Analytical Review"

Solar Operations & Maintenance (O&M)

- ***Preventative Maintenance***

Panel Cleaning	1-2x / Year
Vegetation Management	1-3x / Year
Wildlife Prevention	Variable
Water Drainage	Variable
Electronics / Sensors	Variable
Inverter Servicing	1-2x / Year
Tracker Maintenance	1-2x / Year

- ***Reactive Maintenance***
  - Monitoring Systems
  - Production loss issues
  - Degradation issues

- ***Condition-Based Maintenance***
  - Warranty Enforcement including performance thresholds
  - Equipment Replacement (Planned and Unplanned)

Dominion Considerations for Solar Development

- Benefits
  - Taxes
    - Land
    - Assets constructed on the land
      - §58.1-3660 Certified Pollution Control Equipment Exemption (HB1305 – 3/11/2016)
      - Portion of sales tax may be exempt (panels, inverters, etc.) – racks, conduit, etc. not exempt
    - Direct – Indirect - Induced
  - Construction Jobs (20 MW ~ 250/300 over 6-7 month period)
  - Operational Jobs – 1 FTE – Routine O & M
  - Operational
    - No Noise – No Dust – No Odor
    - Operational Life – 30 to 35 years
    - Free Fuel – When Sun is Shining
  - Educational
    - DVP's Solar in the Classroom Partnership
  - Clean Power Plan/Regulatory Compliance

Dominion

16 Megawatt Solar Facility – Aerial View

Dominion

Solar Facility Under Construction

Dominion

Solar Facility – Frontal View

Dominion

Solar Facility – Rear View

Dominion

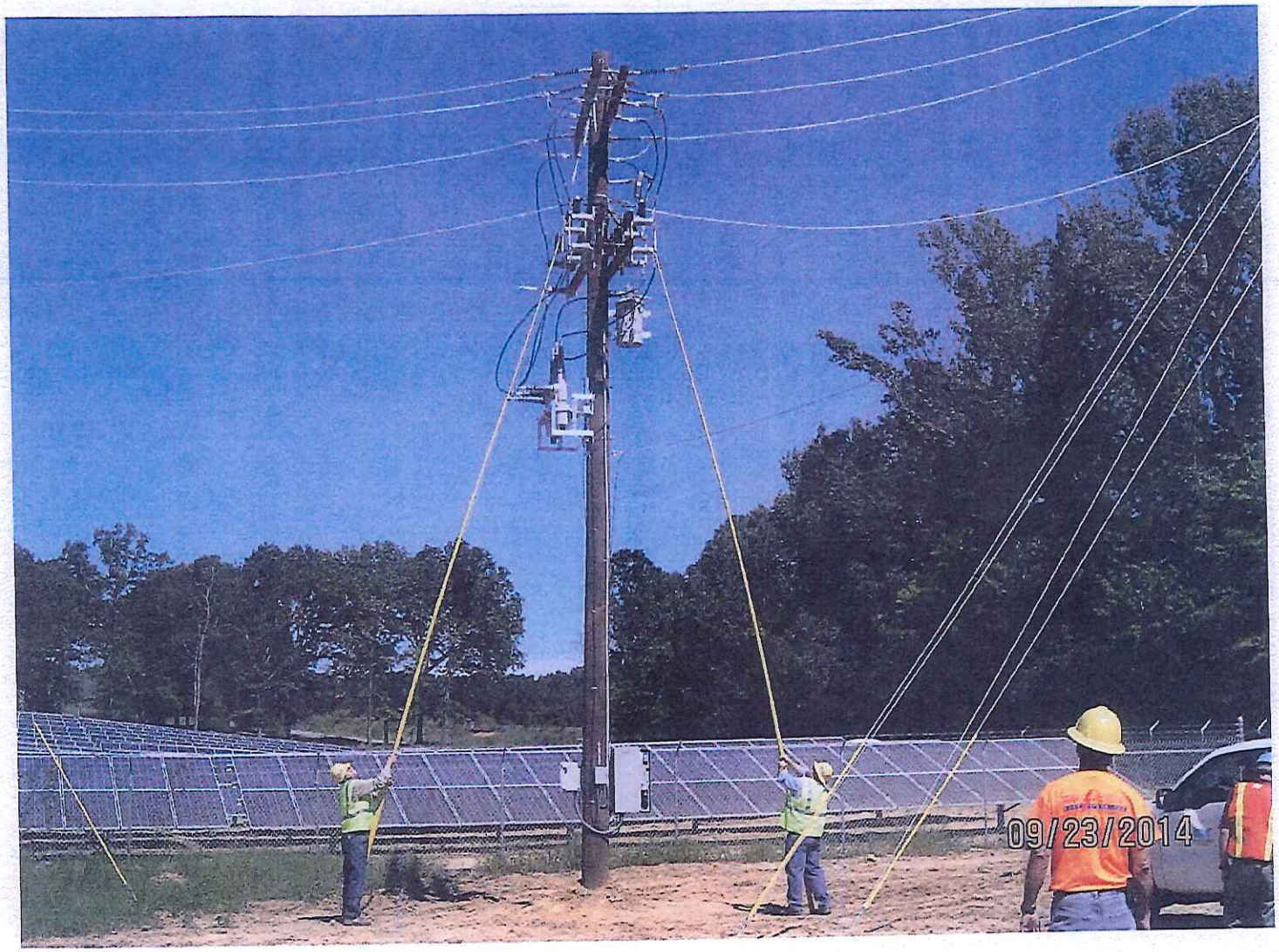
Solar Facility – Transformers & Inverters

Dominion

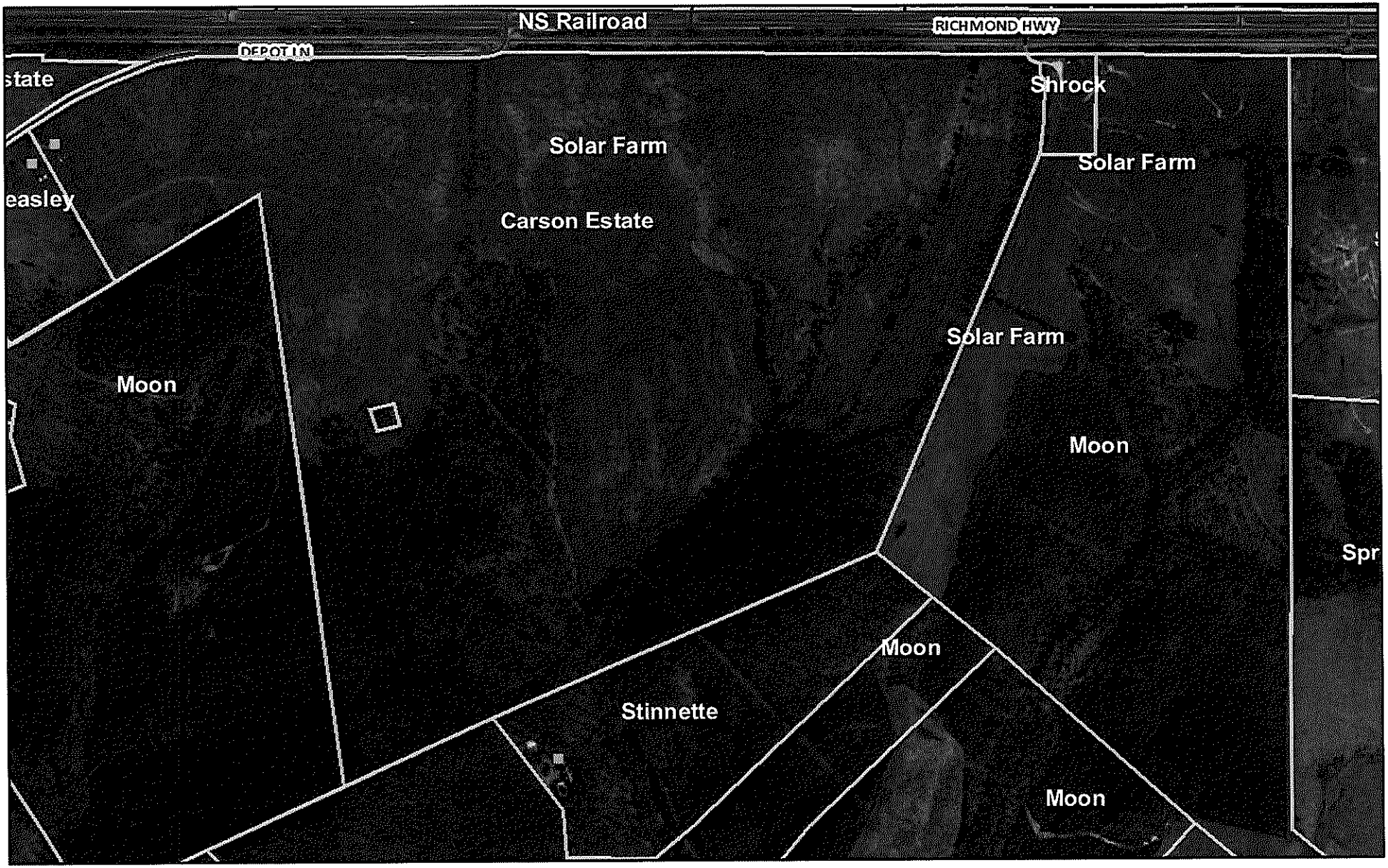
Solar Facility – Security Fencing

Dominion

Solar Facility – Electrical Interconnection



Solar Farm



August 31, 2016

Parcels

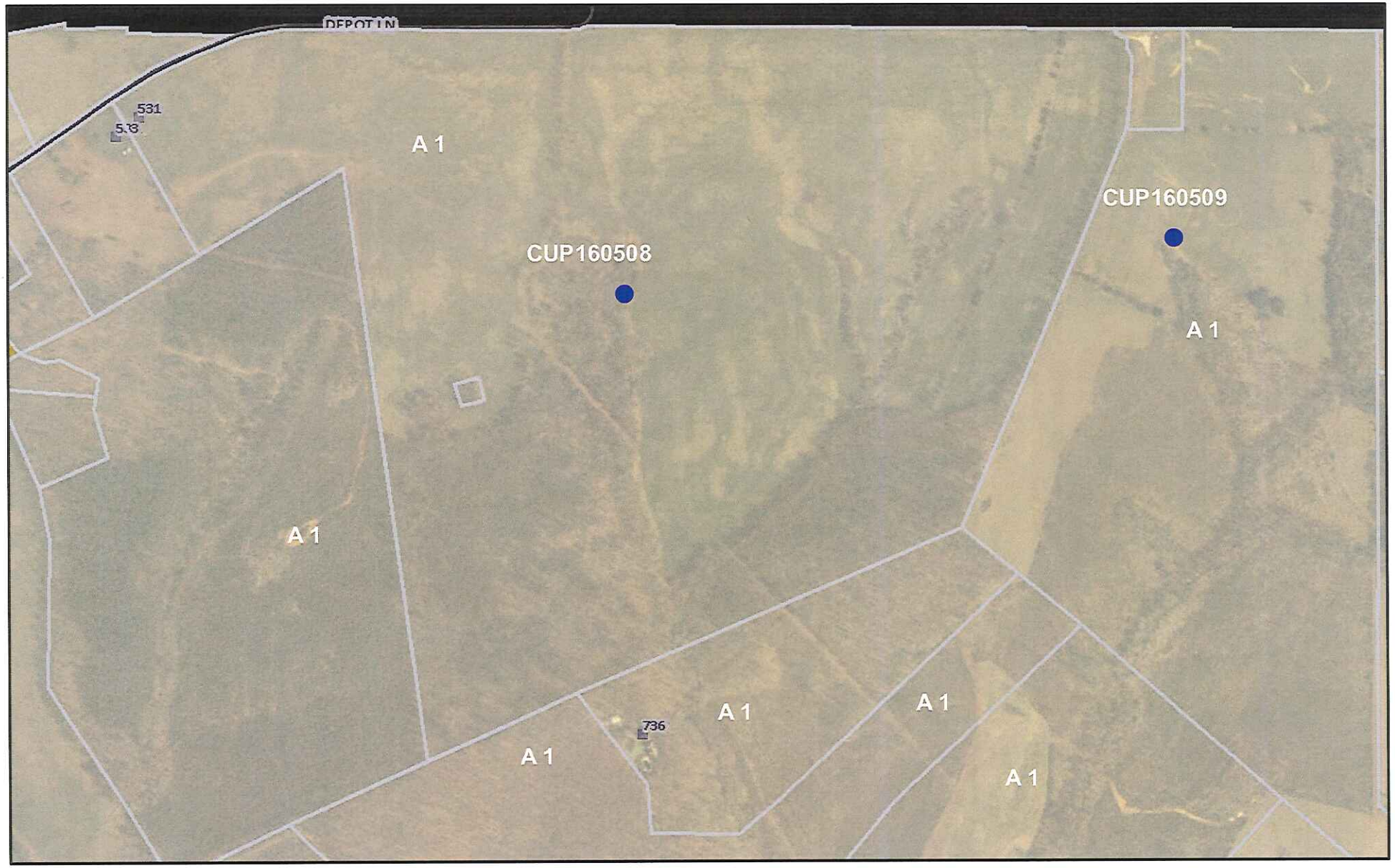
1:9,028

0 0.075 0.15 0.3 mi

0 0.1 0.2 0.4 km

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and

CUP160509 Zoning



September 6, 2016

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Override 1

Parcels

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0 0.075 0.15 0.3 mi

0 0.1 0.2 0.4 km

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and